Forming Equations – page 2

1- $4x + 10$; length is 12 cm
2- $5x + 120 = 360; angle\ is\ 58\ degrees$
3- $12x + 18; 12x + 18 = 48; £2.50\ and\ £5.50$

Rearranging Difficult Formulae – page 3

1- $c = v - 2a - 3b$
2- $t = \frac{A}{\pi+5}$
3- $s = \frac{R-2t}{3+\pi}$
4- $l = \frac{km}{1+k}, m = \frac{l+kl}{k}$
5- $x = \frac{4A-5k}{k}$
6- $u = \frac{u^2-Rv}{kR-1}$
7- $y = \frac{30x+20}{3-3x}$
8- $a = 80b^2 + 3$
9- $y = \sqrt{\frac{s^2}{4\pi^2 d^2}}$

Factorisation – page 4

1-
   a) $2(x + 2)$
   b) $2(y + 5)$
   c) $3(x + 4)$
   d) $3(x - 2)$
   e) $5(x - 3)$

2-
   a) $p(p + 7)$
   b) $x(x + 4)$
   c) $y(y - 2)$
   d) $p(p - 5)$
   e) $x(x + 1)$

3-
   a) $2x(x + 3)$
   b) $2y(y - 4)$
   c) $5p(p + 2)$
   d) $7c(c - 3)$
   e) $3x(2x + 3)$

4-
   a) $2x(x - 2y)$
   b) $2t(t + 5u)$
   c) $2x(3x - 4y)$
   d) $3xy(xy + 3)$

Difference of two squares - page 5

1- $(x-4)(x+4), (a-b)(a+b), (y-3)(y+3), (x-1)(x+1), (x-0.5)(x+0.5), (x-\frac{1}{3})(x+\frac{1}{3})$

2- $(x-2y)(x+2y), (3a^2-b)(3a^2+b), (3x-4y)(3x+4y), (0.25x-y)(0.25x+y), (x-\frac{1}{3}y)(x+\frac{1}{3}y)$

3- $\frac{5(y-2)}{y+5}, \frac{3(2x-1)}{x-2}, \frac{4x}{3x-2}, \frac{5a+4b}{2b}$

Algebraic Fractions – page 6

1- $\frac{3}{7x}, 2xy, 9a^2, \frac{2(x+3)}{5}, \frac{1-7b^2}{3ab^2}$

2- $\frac{x}{x+5}, \frac{x}{x+4}$

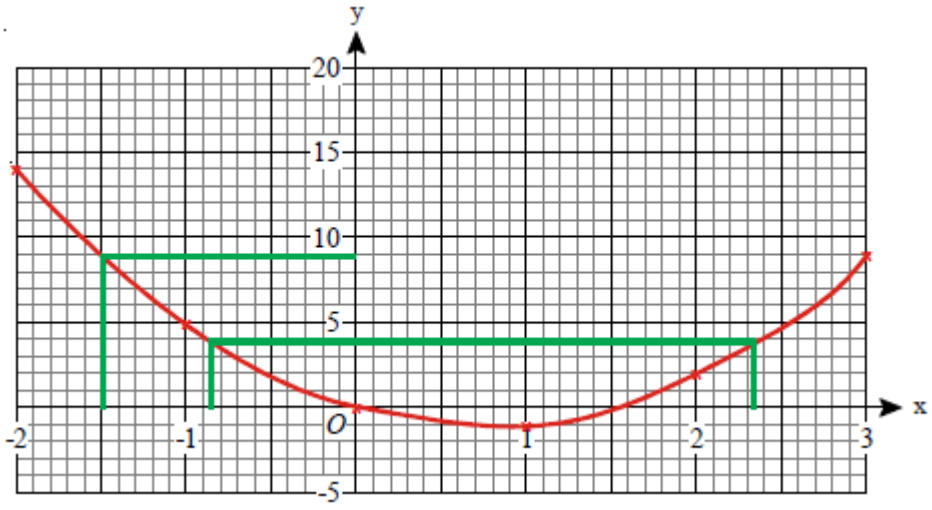
3- $\frac{3x+1}{2x-3}$

4- $\frac{9}{2x}, \frac{11}{12x}, \frac{7x-1}{10}, \frac{x-7}{(x+2)(2x+1)}$

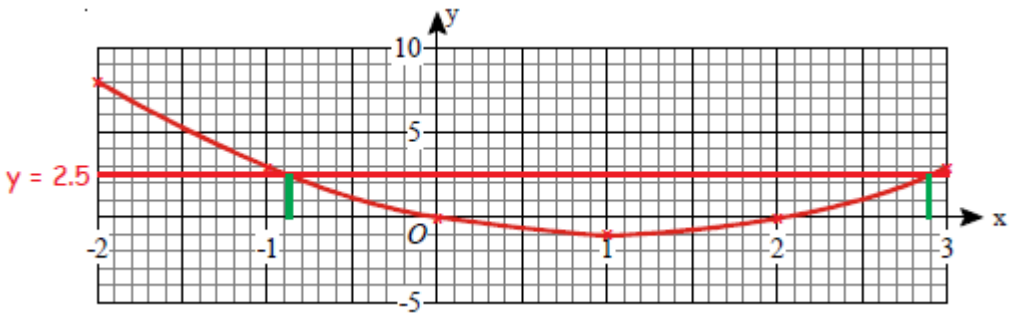
5- 2/3, -2 or 6, 2.5 or 6, -0.5 or 1.5, 2.75, x = 0 or 3

Drawing quadratics – page 7

1- y = 9, x = -0.85 or 2.33



2- x= -0.89 or 2.9



Solving quadratic Equations by factorising - page 8

1-
   a) x = -2 or -3
   b) x = -4 or -5
   c) x = -3 or 2
   d) x = -8 or 3
   e) x = 2 or 4
   f) x = -7or -4
   g) x = -3 or -1/2
   h) x = -3/2 or -1/3
   i) x = -5 or 2/3
   j) x = 7/3 or 9

2- yes, x= -1

3- yes, x= -5

Solving quadratic Equations by factorising - page 9

1. -0.268 or -3.732
2. -0.838 or -7.16
3. -0.562 or 3.56
4. 0.298 or 6.70
5. -3.16 or 0.158
6. -2.27 or 2.94
7. -7.5 or 21.5
8. -1.70 or 7.11
9. 13.0
10. -2.19 or 3.19

Completing the Square - page 10

1. Proof
2. Proof
3. 2 and 6
4. 3 and 8
5. 3 and 9; -9
6. 4 and -21; (4, -21)
7. 25 and 5; 25; x = 5

Simultaneous Equations With a Quadratic - page 11

1. (3, 3) and (-2. -2)
2. (-1, -3) and (4, 12)
3. (5, 7) and (-3, -1)
4. (6, -1) and (1, -5)
5. No points of intersection; (1.4, -4.8) and (4, 3)

Quadratic Inequalities - page 12

1. $-4 < x < -2$
2. $x < -7; 5 < x$
3. $2 \leq x \leq 7$
4. $x < -5; 6 < x$
5. $x < -8;\ 4 < x$
6. $x < -10; -2 < x$
7. $x < -2.5; -2 < x$
8. $8/7 \leq x \leq 2$
9. $0.5 \leq x \leq 6$
10. $x < -15;\ 10 < x$

Proof - page 13

1. Proof
2. Proof
3. Proof
4. Proof
5. Proof
6. Proof

Trigonometry - page 14

1. 22.2
2. 11.6
3. 27.8
4. 64.2
5. 27.9

Bearings by trigonometry - page 15

1. 0.52.2 and 232.2
2. 19.1

Sine and Cosine rules - page 16

1. 36.2
2. 6.30
3. 109.6
4. 13.9 and 11.3

Area of Triangles - page 17

1. 26.8
2. 106
3. 356

3-D coordinates - page 18

1. (5,3,0)
2. (5,0,0)
3. (5,0,4)
4. (0,0,4)
5. (0,3,0)

Pythagoras in 3D - page 19

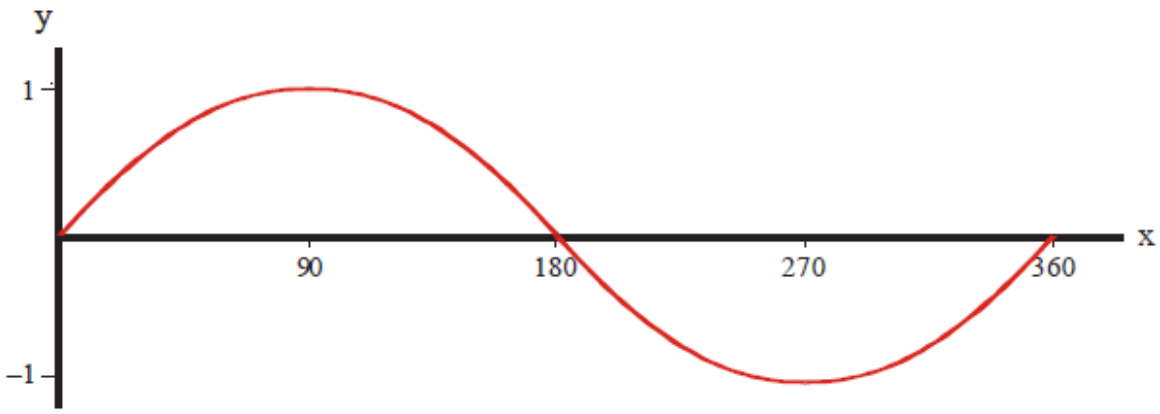
1. 7.81
2. 11.8
3. 27.4
4. 5.5

Trigonometry in 3D - page 20

1. 17.1
2. 55.9 and 26.6

Graphs of Trigonometric Functions - page 21-22

1.

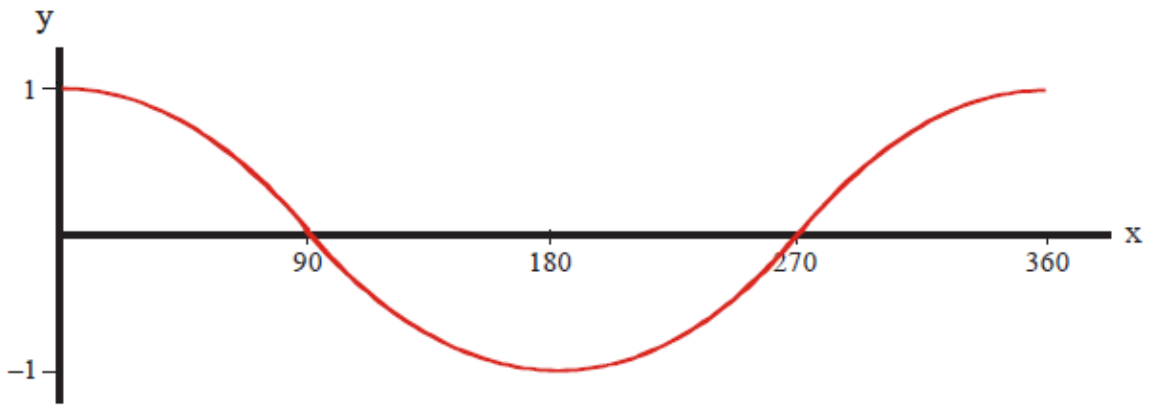


Given that $\sin 30° = 0.5$, write down the value of:

(i) $\sin 150°$ 0.5

(ii) $\sin 330°$ -0.5

2.

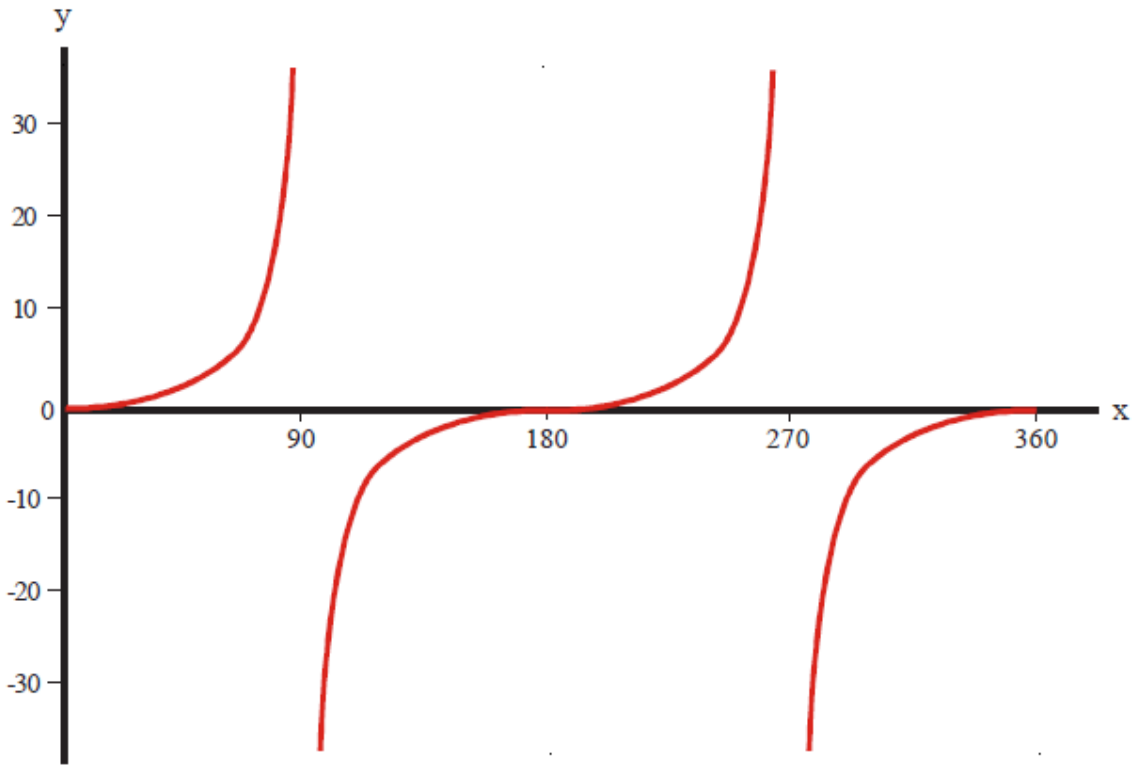


Given that cos 60° = 0.5, write down the value of:

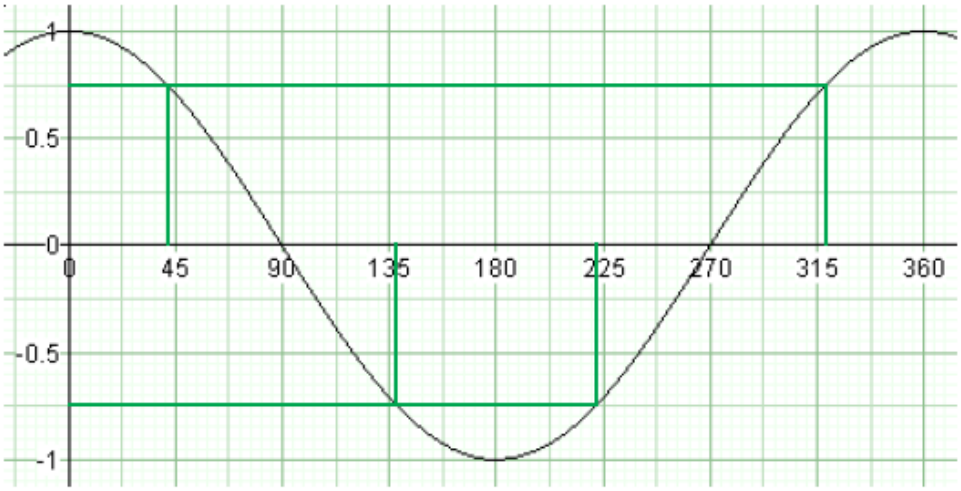
(i) cos 120° -0.5

(ii) cos 240° -0.5

3.



4.



a) Use the graph to solve $\cos x = 0.75$ for $0 \leqslant x \leqslant 360^\circ$ x = 41° and 319°

b) Use the graph to solve $\cos x = -0.75$ for $0 \leqslant x \leqslant 360^\circ$ x = 138° and 221°

Transformations of graphs – page 23

1- (4,-1); (1,-6);(1,1);(0.5,-1); $y = x^2 - 2x$
2- Curve through the origin; stretch along the y-axis by a SF of 2.
3- U shaped parabola with vertex at (2,3)
4- V(-2, -5); $-2 + \sqrt{5}$ and $-2 - \sqrt{5}$

Transformations of Trig Functions– page 24

1- Through the origin, periodicity of 180, asymptotes at 90, 270
2- A=2, b=3

Iterations – page 25

1- 7/16
2- 2.669584272
3- -547/81; -6.561443673; -6.53541368; approximate solutions to the equation

Direct and Inverse Proportion– page 26

1- x = 7y; 7; 14; 70
2- a = 48/b; 48; 6; 4.8; 12; 2; 15
3- 2
4- $p = 3q^2$; 147; 3
5- $y = 4x^2$; c = 16; n = -0.5

Surds – page 27

Please use your calculator to check your work

Fractional and Negative Indices – page 28

1) Simplify

a) $(p^5)^5$ p^{25}

b) $k^3 \times k^2$ k^5

c) $x^5 \div x^2$ x^3

d) $(p^2)^{-3}$ p^{-6}

e) $(m^{-5})^{-2}$ m^{10}

f) $(3xy^2)^3$ $27x^3y^6$

2) Without using a calculator, find the exact value of the following.

a) $4^0 \times 4^2$ 16
$1 \times 16 = 16$

b) $5^4 \times 5^{-2}$ 25
$5^2 = 25$

c) $7^5 \div 7^3$ 49
$7^2 = 49$

d) $\frac{6^7}{6^6}$ 6
$6^1 = 6$

e) $(8^5)^0$ 1
$8^0 = 1$

f) $(2^3)^2$ 64
$2^6 = 64$

3) Work out each of these, leaving your answers as exact fractions when needed.

a) 4^0 1

b) 7^0 1

c) 25^0 1

d) 139^0 1

e) 4^{-2} $\frac{1}{16}$

f) 8^{-1} $\frac{1}{8}$

g) 5^{-3} $\frac{1}{125}$

h) 10^{-5} $\frac{1}{100000}$

i) $49^{\frac{1}{2}}$ 7

j) $32^{\frac{2}{5}}$ 4

k) $27^{\frac{1}{3}}$ 3

l) $16^{\frac{3}{2}}$ 64

m) $49^{-\frac{1}{2}}$ $\frac{1}{7}$

n) $32^{-\frac{2}{5}}$ $\frac{1}{4}$

o) $27^{-\frac{1}{3}}$ $\frac{1}{3}$

p) $16^{-\frac{3}{2}}$ $\frac{1}{64}$

4) $5\sqrt{5}$ can be written in the form 5^n.
Find the value of n. 1.5 $5^1 \times 5^{\frac{1}{2}}$

5) $2 \times \sqrt{8} = 2^m$
Find the value of m. 2.5 $2^1 \times (2^3)^{\frac{1}{2}}$

6) Find the value of x when
$\sqrt{125} = 5^x$ 1.5 $(5^3)^{\frac{1}{2}}$

7) Find the value of y when

$\sqrt{128} = 2^y$ 3.5 $(2^7)^{\frac{1}{2}}$

8) $a = 2^x$, $b = 2^y$

a) Express in terms of a and b

i) 2^{x+y} ab ii) 2^{2x} a^2 iii) 2^{x+2y} ab^2

$ab = 16$ and $2ab^2 = 16$

b) Find the value of x and the value of y. x = 5, y = -1

$16 = 2^x \times 2^y$ $16 = 2(2^x \times 2^y \times 2^y)$

$= 2^{x+y}$ $8 = 2^x \times 2^y \times 2^y$

$x + y = 4$ $x + 2y = 3$

Equations of Circle and Loci – page 29

1. proof
2. proof

Cubic and Reciprocal Functions– page 29

1) a) Complete this table of values for

$y = x^3 + x - 4$

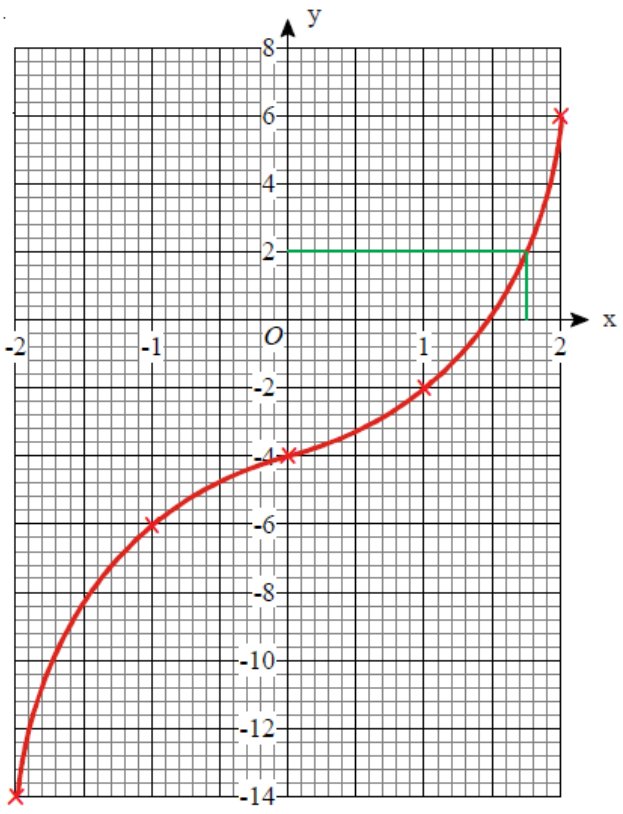
x	–2	–1	0	1	2
y	–14	-6	-4	–2	6

b) On the grid, draw the graph of

$y = x^3 + x - 4$

c) Use the graph to find the value of x when y = 2

x = 1.75



2) a) Complete this table of values for

$y = x^3 + 2x$

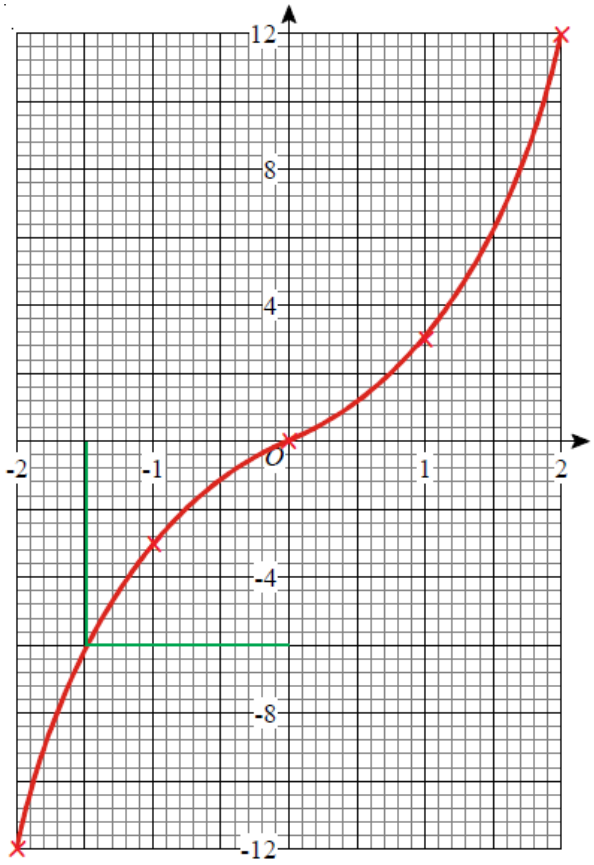
x	–2	–1	0	1	2
y	–12	-3	0	3	12

b) On the grid, draw the graph of

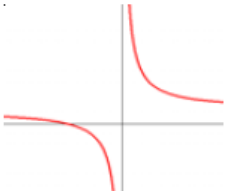
$y = x^3 + 2x$

c) Use the graph to find the value of x when y = -6

x = -1.5



3) Sketch the graph of $y = 1 + \frac{1}{x}$ in your book.



Recognise the shapes of functions – page 31

$y = 2^x; y = 2x^2 + 1; y = 3x^3; y = -2x^3$

$y = 5x - x^3; y = \frac{2}{x}; y = -\frac{2}{x}; y = 3x - 1$

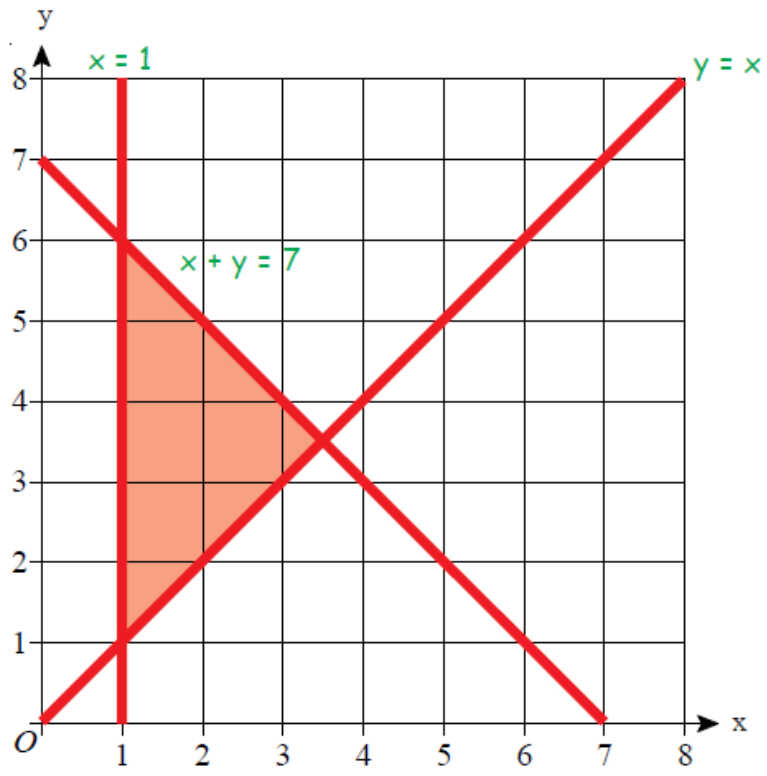
Graphs of exponential functions– page 32

1- $p = 0.6; q = 5$

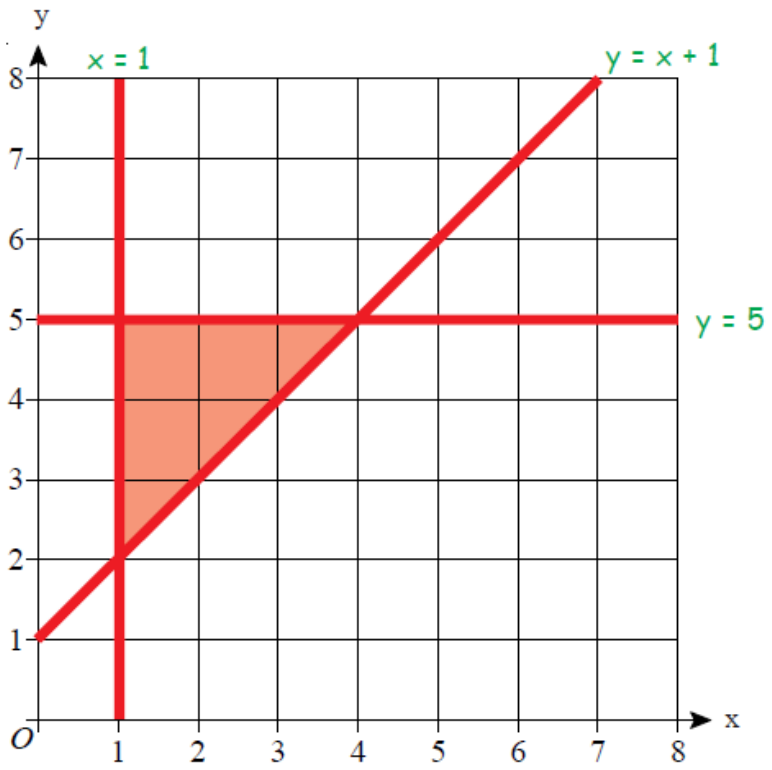
2- Draw a right-angle triangle of dimension $y, x \text{ and } y - 3$

Region– page 33

1.



2.



Vectors - page 34-35

1. Proof
2. k = 0.5
3. k = 0.25
4. k = 4

Vectors - page 36

1- p+q; 2p vs. p
2- 3a – 3b; 9a vs. 3a

Averages from a table - page 37

1- 52; 2; 2; 5
2- Explanation; 1.92
3- 30 < t <=45; 37

Scatter Graphs - page 38

1- Positive; round 14
2- Negative; close to 13.6

Cumulative Frequency - page 39

Plotting using the upper bounds; answers close to 34; 11.3; 8

Box plots - page 40

1- 19.5
2- Drawn accordingly

Histograms - page 41

1- Correct fd;
2- Table with 5; 12; 34 and 8

Tree Diagrams - page 42

1. 0.42
2. 42/90
3. 36/56; 26/56; 30/56
4. 30/210; 108/210

And & Or Questions – page 43

1. 9/32
2. 0.0036; 0.1128
3. 0.66

Venn Diagrams – page 44

1. 1/16
2. 4
3. 29